CENTRAL UTAH PROJECT
BONNEVILLE UNIT

MUNICIPAL AND INDUSTRIAL SYSTEM

FINAL SUPPLEMENT

TO THE

FINAL ENVIRONMENTAL STATEMENT

UNITED STATES
DEPARTMENT OF THE INTERIOR

BUREAU OF RECLAMATION

DEPARTMENT OF THE INTERIOR

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. Administration.

Mission of the Bureau of Reclamation

The Bureau of Reclamation of the U.S. Department of the Interior is responsible for the development and conservation of the Nation's water resources in the Western United States.

The Bureau's original purpose "to provide for the reclamation of arid and semiarid lands in the West" today covers a wide range of interrelated functions. These include providing municipal and industrial water supplies; hydroelectric power generation; irrigation water for agriculture; water quality improvement; flood control; river navigation; river regulation and control; fish and wildlife enhancement; outdoor recreation; and research on water-related design, construction, materials, atmospheric management, and wind and solar power.

Bureau programs most frequently are the result of close cooperation with the U.S. Congress, other Federal agencies, States, local governments, academic institutions, water user organizations, and other concerned groups.

FINAL SUPPLEMENT TO THE FINAL ENVIRONMENTAL STATEMENT

Municipal and Industrial System

Bonneville Unit
Central Utah Project
Summit, Wasatch, Utah, and Salt Lake Counties, Utah

Prepared by

U.S. Department of the Interior
Bureau of Reclamation
Upper Colorado Region
Salt Lake City, Utah

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Corps of Engineers
Sacramento District
Sacramento, California

This supplement describes the environmental impacts of proposed modifications to the Municipal and Industrial (M&I) System plan and impacts not previously covered by the Final Environmental Statement (FES) (79-55). This document is the National Environmental Policy Act compliance document for Section 404 permits under the Clean Water Act (Public Law 95-217). Modifications include relocating U.S. Highway 189 along an alignment different from that described in the FES, adding a new Wasatch County road, relocating reservoir outlet works, adjusting the Jordanelle Reservoir management boundary, modifying the fishery mitigation/recreation plan for the Provo River between the proposed Jordanelle Dam and the existing Deer Creek Reservoir, and modifying the wildlife mitigation plan. Also included are impacts to wetlands not covered in the FES and results of consultation with the Fish and Wildlife Service under Section 7 of the Endangered Species Act for the June sucker, a fish found in Utah Lake and recently listed as an endangered species.

For further information on the processing or content of this document, please contact the Regional Director, Bureau of Reclamation, 125 South State Street, P.O. Box 11568, Salt Lake City, Utah 84147, or call commercial (801) 524-5580 or FTS 588-5580.

Statement No. INT-DES 79-18 dated April 5, 1979

Final Statement No. INT-FES 79-55 dated October 25, 1979

Draft Supplement to the FES No. INT DES 86-37

Date filed with the EPA: August 28, 1986

Final Supplement to the FES No. FES 87-08

Date filed with the EPA: 16 MAR 1987

ATTACHMENT A

WETLAND ANALYSIS

Prepared by U.S. Army Corps of Engineers
and U.S. Bureau of Reclamation

I. WETLAND DESCRIPTIONS AND VALUES

A. Introduction

Field investigations were conducted by the Corps of Engineers during the spring of 1986 to determine the extent and value of the wetlands in the Jordanelle project area since it had not been done for the FES. An area was delineated as wetland if it was inundated or saturated by surface or ground water at a frequency and duration to support a prevalence of vegetation typically adapted to life in saturated soils. The wetlands mapped under this definition were primarily "palustrine persistent emergent wetlands"[1/] characterized by saturated or flooded soils with sedges, rushes, and grasses being the dominant vegetation. The location of these wetlands is shown on Figure A-1 on page 110.

In commenting on the draft supplement to the 1979 FES, the Environmental Protection Agency felt that riparian areas should also fall under the wetland classification. The riparian areas, other than the emergent wetlands, consist primarily of wooded areas adjacent to the Provo River. These wooded areas are characterized by unsaturated surface soils with broad-leaved deciduous trees and shrubs as the dominant vegetation. A section has been added describing the wooded riparian habitat.

B. Emergent Wetlands

1. Emergent wetlands within the proposed Jordanelle Reservoir Basin

Approximately 135 acres of "palustrine persistent emergent wetlands were identified within the proposed reservoir basin (see Figure A-1). Eighty-five acres are along the Provo River and 50 acres are along Drain Tunnel and Ross Creeks.

Many of the wetlands receive their water from hillside seeps and springs or from small drainages which empty into broader flood plains and then flow into the Provo River or Drain Tunnel Creek. These sites contain willows (Salix sp.), alder (Alnus incana), sedges (Carex sp.), rushes (Juncus sp.), cattails (Typha sp.), and duckweed (Lemna sp.). Soils at these sites tend to be organic or mineral soils with a high organic content.

1/ Fish and Wildlife Service. 1979. Classification of Wetlands and Deep Water Habitats of the United States. FWS/OBS-79/31, page 12.

Other wetland areas receive their water from inundation by or ground water from the Provo River. The river is extremely braided in this area, and many oxbows and sloughs exist which contain some beaver activity. The vegetation is primarily willows, sedges and rushes. The soils are loamy to sandy and generally are 10 yr 3/1 in color.

Some wetlands within the reservoir site are enhanced hydrologically by the presence of irrigation canals which leak and by flood irrigation. These areas are primary pastures used for grazing cattle and sheep along Ross Creek and Drain Tunnel Creek. Plants include sedges, rushes, cattails, buttercups (Ranunculus sp.) and duckweed. The soils tend to be organic or with a 6-inch layer of organic soil overlying mineral soil.

Along the Provo River the 85 acres of wetlands are seasonal to permanent and provide water purification for agricultural contaminants and sediment; habitat for waterfowl, various mammals, and fish; and flood storage. The 50 acres in the Drain Tunnel drainage are valuable primarily for water purification and wildlife grazing.

2. Emergent wetlands along the proposed highway relocations

Approximately 18[1/] acres of palustrine persistent emergent wetlands were identified within the proposed highway rights-of-way. Most of these occur on Silver Creek and adjacent to the Provo River (see Figure A-1). The rest are small sites located on the cross drainages.

The wetlands are generally located in flood plains and receive their water from both the streams and from ground water flowing into the flood plain. The plants include cattails (Typha latifolia), sedges (Carex nebrascensis and aquatilus), rushes (Juncus balticus and nevadensis), skunk weed (Polemonium occidentale), reed canary grass (Phalaris arundinaceae), large leaf avens (Geum macrophyllum), and willows (Salix sp.). The soils vary from organic to mineral and exhibit colors of 5 yr 2.5/1 and 10 yr 3/1.

The 18 acres of wetlands are generally inundated or saturated on a semipermanent basis. They provide good wildlife habitat, flood storage, and water purification.

C. Wooded Riparian Habitat

There are approximately 562 acres of wooded riparian habitat which would be affected by Jordanelle Reservoir and highway relocation alignments. The draft supplement recorded a loss of 634 acres of riparian habitat; however, that estimate included 72 acres of the emergent wetlands found within the riparian areas.

1/ This estimate has been reduced from the 30 acres stated in the draft supplement. Moving the north interchange of the relocated U.S. 40 further to the north has reduced the loss of Silver Creek wetlands by about 12 acres.

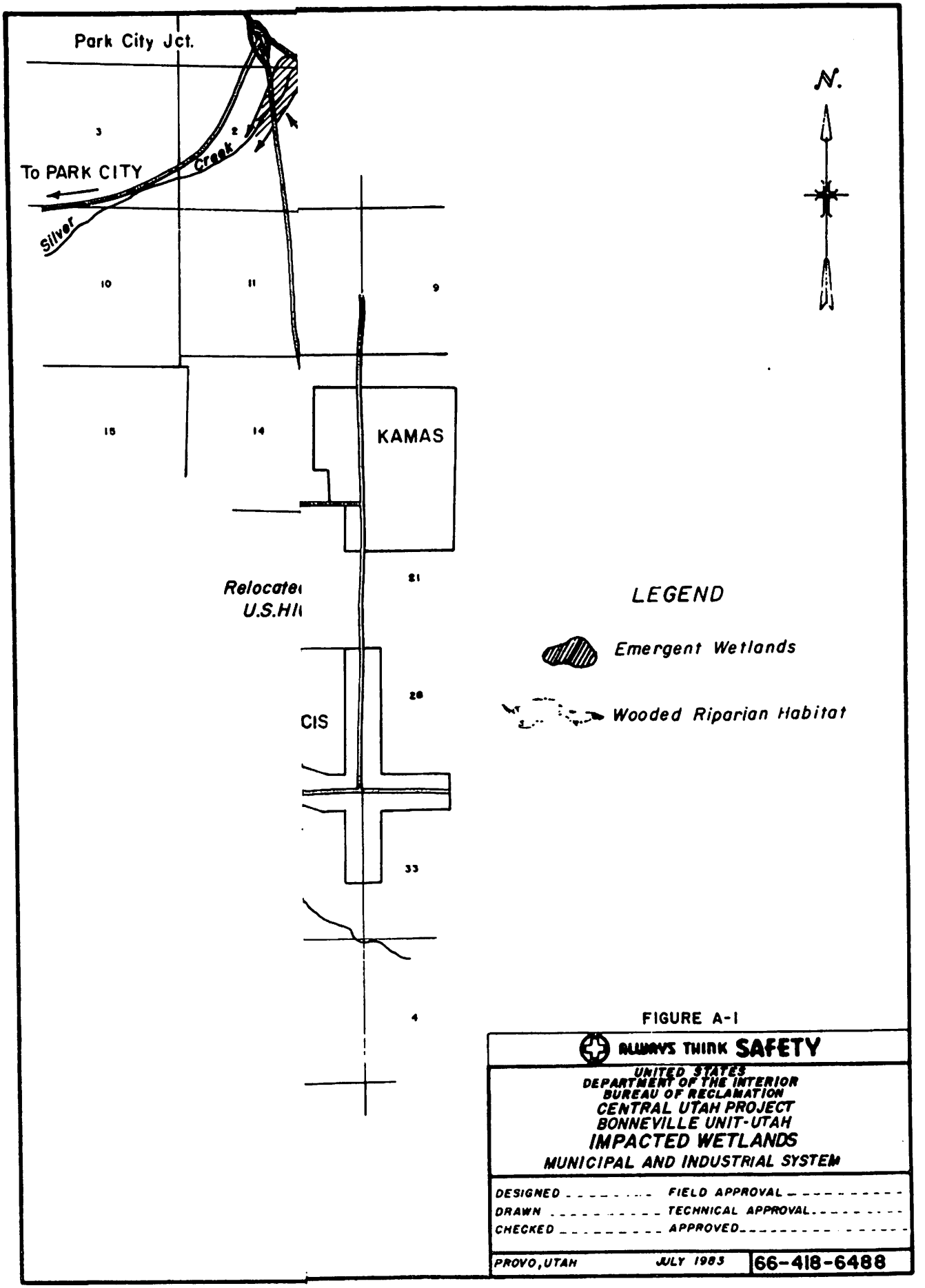

FIGURE A-1

ALWAYS THINK SAFETY

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL UTAH PROJECT
BONNEVILLE UNIT-UTAH
IMPACTED WETLANDS
MUNICIPAL AND INDUSTRIAL SYSTEM

DESIGNED ..... FIELD APPROVAL .....
DRAWN ..... TECHNICAL APPROVAL .....
CHECKED ..... APPROVED .....

PROVO, UTAH JULY 1983 66-418-6488

The wooded riparian habitat is confined to narrow bands of woody vegetation along the Provo River and its tributaries. Deciduous trees and shrubs are the dominant overstory vegetation, while grasses and forbs are the dominant ground cover.

Narrowleaf cottonwood (Populus angustifolia) is the dominant tree species. Western black willow (Salix lasiandra caudata) is the second most common tree species. Additional tree species found in the wooded riparian community are thinleaf alder (Alnus incana) and river hawthorn (Crataegus douglasii rivularis). Various willow species account for most of the shrub cover. Other shrubs include wild rose (Rosa woodsii), Utah serviceberry (Amelanchier utahensis), and bearberry honeysuckle (Lonicera involucrata).

The wooded riparian habitat is sustained by the high ground water table along the river and as such could be classified as a "palustrine broad-leaved deciduous forested wetland" (Fish and Wildlife Service, 1979).

II. WETLAND IMPACTS

A. Emergent Wetlands

The emergent wetlands described above would be totally lost as a result of the construction and operation of Jordanelle Dam and Reservoir accompanied by highway relocations. The total loss would be about 153 acres, 135 of which would be caused by Jordanelle Dam and Reservoir and 18 acres by highway relocations. The water quality, wildlife habitat, flood storage, and recreational values of the wetlands would also be lost.

B. Wooded Riparian Habitat

The 562 acres of wooded riparian habitat described above would be lost primarily from construction and operation of Jordanelle Dam and Reservoir. Small losses (included in the total) would result from construction of highways and recreation facilities. The wildlife habitat, flood storage, and recreational values of the riparian woodland would also be lost.

III. WETLAND MITIGATION PLAN

A. Introduction

The wetland and riparian habitat mitigation plans as presented in the draft supplement were cooperatively formulated by Reclamation, the Corps of Engineers, the Fish and Wildlife Service, and the Utah Division of Wildlife Resources. All of these cooperating agencies agreed that the plans adequately mitigated the wetland and riparian values lost. During review of the draft supplement, the Environmental Protection Agency (EPA) questioned the adequacy of the plans and requested that additional analysis be done and that additional measures be developed to

more fully provide for in-kind compensation of wetland losses. As a result of the EPA request, Reclamation has committed to reanalyze the wetland mitigation plan using a habitat-based analysis. This analysis will be done in cooperation with the involved agencies. Elements which will be considered in the revised plan are discussed below.

B. Jordanelle Reservoir As Compensation For Wetland Losses

The proposed Jordanelle Reservoir at active capacity would have a surface area of about 3,068 acres. The average surface area would be about 2,539 acres. Most of the reservoir area (a "lacustrine" ecosystem) would be classified as deep water or "limnetic" habitat (Fish and Wildlife Service 1979).

Some of the shoreline or "littoral" area of the reservoir could be classified as "lacustrine littoral wetland". According to the Fish and Wildlife Service (1979) definition, the littoral wetland would extend from the shoreward boundary of the system to a depth of about 6.6 feet. With this definition, the proposed Jordanelle Reservoir would provide a littoral wetland measuring about 103 acres at the average water surface elevation. However, it is estimated that only about two-thirds (or 69 acres) of this amount would be included in the Corps of Engineers' definition of littoral wetlands (those shoreline areas on the north and east ends of the reservoir with gentle, flat gradients).

EPA and others who commented on the draft supplement were opposed to the concept that wetland values be attributed to the littoral area of Jordanelle Reservoir. Their contention was that, due to the highly fluctuating nature of the reservoir, there would be no significant development of emergent vegetation along the fringe of the reservoir. While this may be true, Reclamation still contends that both the limnetic and littoral habitats in the reservoir would provide partial compensation for some lost wetland values. These potential values are as follows:

1. Flood Prevention.--The dam and reservoir would be designed with a surcharge capacity of about 12,800 acre-feet for flood control. This would exceed the temporary flood retention benefits exhibited by the existing wetlands and flood plain.

2. Water Quality Protection.--The reservoir would be managed to minimize water quality problems within the reservoir itself and to improve the downstream water quality of the Provo River and Deer Creek Reservoir. Adherence to the proposed Water Quality Management Plan would replace the filtering value of the existing wetlands. Sediments, nutrients, and heavy metals would be better controlled with the reservoir in-place.

3. Wildlife Habitat.--The littoral habitat of the proposed reservoir would provide replacement breeding and feeding habitats for water-oriented species such as waterfowl, shore and wading birds, and furbearers. The open water areas would provide resting areas for many

species of migratory birds. The shoreline area would also provide valuable watering areas for terrestrial wildlife species.

4. Recreation.--The reservoir would provide many more recreational days than the existing wetlands and surrounding area now provide. The type of recreational activities would change toward flatwater fishing and water contact sports. However, there still would be ample opportunities for other activities such as hiking, hunting, photography, and environmental education.

Reclamation will study the possibility of developing replacement wetlands along the shoreline of the reservoir to promote sustained wetland vegetative types. This effort will be accomplished in cooperation with the Corps of Engineers, the Environmental Protection Agency, the Fish and Wildlife Service, and the Utah Division of Wildlife Resources. It is possible that some wetland acreage could be developed in conjunction with sediment detention basins in select drainages as proposed by the Water Quality Management Plan. Also, as proposed in the May 7, 1986, Draft Mitigation Plan, Reclamation will study the possibilities of creating wooded riparian habitat on management lands acquired for the Jordanelle Reservoir.

C. Habitat Protection and Management As Compensation For Wetland Losses

Protection and management of wooded riparian and emergent wetland habitats, on lands which have been acquired for project (Bonneville Unit) purposes or on lands which are proposed for acquisition, would ensure the protection and conservation of approximately 563 acres of wooded riparian habitat and 106 acres of emergent wetlands and would, over time, enhance their values. These woodlands and wetlands are similar in type to those which would be lost in the Jordanelle Reservoir area. They are located on Currant Creek above U.S. Highway 40 in eastern Wasatch County, on the Strawberry River above the Pinnacles in western Duchesne County, and on Rock Creek at Lower Stillwater in northern Duchesne County. These lands total about 4,092 acres. The emergent wetlands are found interspersed with the riparian woodlands (Table A-1).

Table A-1
Habitats to be protected and managed to increase their values
(Unit--acres)

Location	Upland habitat	Wooded riparian	Emergent wetland	Total
Currant Creek 1/	780	132	33	945
Strawberry River 1/	2,595	218	19	2,832
Rock Creek 1/	48	213	54	315
Totals	3,423	563	106	4,092

1/ Lands already under Reclamation ownership.

The lands listed in Table A-1 would be turned over to resource management agencies which would be required to manage the lands under a

management plan approved by all cooperating agencies. The lands would be managed in perpetuity for the protection, conservation, and enhancement of upland, riparian woodland, and emergent wetland habitats and their respective wildlife populations. Protection and management of the 106 acres of emergent wetlands, along with the surrounding 563 acres of riparian woodland and 3,423 acres of upland habitats, would provide partial in-kind/out-of-place compensation for wetland wildlife and riparian habitat losses. These measures would also provide out-of-place improvements in flood retention, water quality protection, and recreational values. Specific habitat developments, such as the creation of more wetted habitat, could enhance these areas. Reclamation will study this possibility in cooperation with the participating agencies.

D. Upper Provo River reservoir stabilization as compensation for wetland losses

Wetland values created by stabilizing the upper Provo River reservoirs were not discussed in the draft supplement. The following analysis has been prepared to document those values as partial compensation for emergent wetland losses at Jordanelle Reservoir.

Under the M&I System, 12 of the 15 high mountain reservoirs on the upper Provo River drainage would be stabilized to enhance their fishery, recreational, and esthetic values. These reservoirs have historically been drawn down on an annual basis to provide downstream irrigation deliveries. These annual summer drawdowns have left the respective shorelines of each reservoir with little or no vegetal cover. Adjacent vegetative types are conifer forests and grass-sedge-peat meadows.

With the proposed stabilization, it is expected that the shoreline areas of 12 of the reservoirs would provide suitable habitat for the establishment of littoral wetland habitat similar to other natural lakes in the area. Aquatic submergents such as quillwort (Isoetes spp.), burreed (Sparganium spp.), and starwort (Callitriche spp.) would become established. Floating waterlilies (Nuphar polysepalum) would occur more frequently. Aquatic emergents along the shallows would consist of sedges (Carex spp.), rushes (Juncus spp.), some grasses and peat moss (Sphagnum acutifolium and S. girgensohnii) where there now is very little, if any, vegetal growth.

For purposes of the evaluation, it is assumed that the littoral wetland would extend from the shoreline out to a depth of about 6 feet (Fish and Wildlife Service, 1979). Stabilization of the 12 designated reservoirs would, thus, provide about 72 acres (Table A-2) consisting of "lacustrine aquatic beds" and "emergent wetlands" (Fish and Wildlife Service, 1979). The wetland vegetation along with the stabilized water surface would greatly enhance the fishery, wildlife, esthetic, and recreational value of the reservoirs as well as provide water quality and erosion protection along the shorelines.

Table A-2
Surface area of upper Provo River reservoirs under drawdown and stabilized conditions and amount of littoral wetlands created (Unit--acres)[1/]

Reservoirs	Area		Littoral wetlands created[2/]
	Present drawdown	Stabilized elevation	
Big Elk Lake	3/	3/	0
Crystal Lake	7.6	9.8	7.0
Duck Lake	8.8	21.4	7.6
Fire Lake	7.7	7.7	0.9
Island Lake	28.1	29.2	7.6
Long Lake	21.5	46.5	8.3
Lost Lake	17.4	45.7	9.6
Marjorie Lake	4.5	17.2	5.7
Pot Lake	3.3	3.9	.8
Star Lake	8.5	13.1	5.2
Teapot Lake	10.7	12.7	3.5
Trial Lake	3/	3/	0
Wall Lake	3/	3/	0
Washington Lake	39.5	87.0	13.1
Weir Lake	3.4	7.4	2.8
Total	161.0	301.6	72.1

1/ From Reclamation Reports, 1979 and 1985.
2/ Surface area from shoreline to 6-foot depth, under stabilized conditions.
3/ Some drawdown will continue.

IV. CONCLUSIONS OF WETLAND ANALYSIS

Construction and operation of Jordanelle Dam and associated features would result in the direct permanent loss of about 153 acres of emergent wetlands and 562 acres of wooded riparian habitat.

The mitigation plans, as described in the draft supplement to the M&I System FES, were developed by Reclamation, the Corps of Engineers, the Fish and Wildlife Service, and the Utah Division of Wildlife Resources. These agencies agreed that the plans were adequate to mitigate the wetland and riparian values lost. The measure proposed in the plans included (1) compensation credit for the creation of about 69 acres of littoral wetlands at Jordanelle Reservoir and (2) protection and management of 669 acres of combined riparian and wetland habitats on other project lands.

Subsequent to filing the draft supplement, Reclamation also analyzed wetland values which would be created by stabilizing 12 of the upper Provo River reservoirs. It was concluded in the analysis that this would result in the creation of about 72 acres of littoral emergent wetlands similar in kind and value to wetland habitats associated with other high mountain lakes in the area. These values have been incorporated into the mitigation plans.

The Environmental Protection Agency and others who commented on the draft supplement did not agree with the concept that wetland values be attributed to the littoral area of the Jordanelle Reservoir. They expressed the concern that there would be little development of emergent vegetation along the fluctuating shoreline. They also did not agree with the concept of crediting the protection and management of existing riparian and wetland habitats as full mitigation for loss of similar habitats. They requested that additional wetland mitigation be provided and a habitat-based analysis be present to more adequately show the relationship of losses versus compensation.

Reclamation has committed to reanalyze the wetland and riparian habitat mitigation plans using a habitat-based procedure. This analysis will be done in cooperation with the EPA and the other involved agencies. If the plans are found to be inadequate, Reclamation will explore the possibilities of creating wetland and wooded riparian habitats within the Jordanelle Reservoir management boundary or will implement other appropriate measures.